COMETARY DUST: CORRELATIONS AMONG OPTICAL PROPERTIES

Martha S. Hanner
Jet Propulsion Laboratory

The observable polarization produced by an ensemble of cometary dust particles depends in a complex way on their size, shape, composition, and degree of aggregation. One approach to understanding the relative effects of these various physical parameters is to look for trends of the polarization with other scattering properties. Spatial maps of the polarization and the thermal emission in the inner coma of comet Hale-Bopp are particularly suitable for this comparison. Moreover, the dynamical properties of the grains that influence the spatial structure provide additional constraints.

We find a clear correlation between stronger polarization, higher albedo, higher infrared color temperture, higher 3-5 micron thermal flux, and stronger infrared silicate emission features. The same trends are observed when comparing different comets and when analyzing maps of the coma of Hale-Bopp.

The observations will be summarized briefly and possible explanations for the correlations will be discussed.